AD

4

* NOTICES *

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CLAIMS

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(57) [Claim(s)]
[Claim 1] The color sorting machine style of the cathode-ray tube which is formed in the color sorting machine style which **** on a frame the color sorting electrode structure which consists of a grid element assembly of a large number arranged in the predetermined pitch, and changes from the super-low carbon steel plate containing the nitrogen (N) said whose color sorting electrode structure is 400 ppm - 100 ppm, and changes.
[Claim 2] the claim whose components of a super-low carbon steel plate are below C:0.03% (below the same% of the weight), less than [Si:0.03%], Mn:0.20-0.60%, P:0.10% or less, S:0.10% or less, less than [Sol.aluminum:0.10%], other Fe(s), and an unescapable impurity -- a color sorting machine style given in the 1st term.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[Industrial Application]
This invention relates to the presentation of the color sorting machine style of a cathode-ray tube, especially its color sorting electrode structure.
[Summary of the Invention]
this invention controls the content of the nitrogen of the color sorting electrode structure in the color sorting machine style of a cathode-ray tube to predetermined within the limits — melanism — generating of the creep in the case of processing is controlled, and it enables it to prevent tension change
[Description of the Prior Art]
The color sorting machine style of which the color sorting electrode structure (the so-called aperture grille structure) in which many grid element assemblies were formed **** and consists between [one pair in which a frame-like frame carries out phase opposite of] supporter material is known as a slit to which an electron beam passes through between the grid element assemblies which adjoin each other, for example as a color sorting machine style used for a color cathode-ray tube. This aperture grille structure is manufactured as follows, for example. First, after rolling out the super-low carbon steel which contains the carbon of a unit 1/1000% to 0.02-0.30mm of board thickness, many grid element assemblies are formed by etching, and an aperture grille structure is obtained. Next, welding pressure is removed after carrying out the seam welding of this aperture grille structure to the frame in the condition of having been pressurized inside. Thereby, the stability of a frame joins a grid element assembly and tension arises. in order [then,] to prevent generating of a secondary electron, thermal radiation, rust formation, etc. — 450-470 degrees C and the melanism for 10 - 20 minutes — it has processed.

[Problem(s) to be Solved by the Invention]
Conventionally, the fall of the tension of the grid element assembly of an aperture grille structure may arise during manufacture, and it had become a quality control top problem. the melanism of the aperture grille structure which this mentioned above — it is because creep is occurred and extended to a grid element assembly with heat and tension in the case of processing. Thus, after completing the television receiver, vibration of a grid element assembly became large and the grid element assembly with which creep was large with the element assembly and tension declined caused [of the screen] a color gap, when it enlarged sound volume working. In order to solve such a trouble conventionally, the welding pressure of the turnbuckle of a frame is raised. Although a cure, such as preparing a cushion in the loudspeaker section which raises the rigidity of an aperture grille structure and is made strong and which shifts the pressurizing point of a turnbuckle, and the supporter of a cathode-ray tube, respectively, was considered, still sufficient effectiveness was not acquired.
This invention offers the color sorting machine style of the cathode-ray tube which can solve the above-mentioned trouble.
[Means for Solving the Problem]
This invention is characterized by consisting of the super-low carbon steel plate containing the

nitrogen whose color sorting electrode structure is 40 ppm – 100 ppm in the color sorting machine style which the color sorting electrode structure by which array formation of many grid element assemblies was carried out in the predetermined pitch through the slit which an electron beam passes is ****(ed) on a frame, and changes.
the place which analyzed the chemical constituent of a color sorting electrode structure — melanism — it found out that correlation was between generating of the creep at the time of processing, and the nitrogen content in a color sorting electrode structure. That is, the aperture grille structure to which a creep tends to happen had the low nitrogen content as compared with the color sorting electrode structure to which a creep cannot happen easily, and was 27 ppm or less. Moreover, the nitrogen content of the conventional color sorting electrode structure was less than 40 ppm at the maximum. And in order to be hard coming to carry out a creep and to control a creep so that the nitrogen content increases, at least 40 ppm is required for a color sorting electrode structure. When lower than 40 ppm, the depressor effect of a creep is small, and the effectiveness of ******** is not accepted when lower than 30 ppm. However, if it increases more than 100 ppm, the depressor effect over a creep will reach an abbreviation saturation state. Therefore, as for a nitrogen content, it is desirable to make it 55 ppm – about 75 ppm.
Moreover, it takes below C:0.03% (it is below the same% of the weight.) for less than [Sol.aluminum:0.10%], other Fe(s), and an unescapable impurity of the component in a super-low carbon steel plate less than [Si:0.03%], Mn:0.20-0.60%, P:0.10% or less, and S:0.10% or less. In these components, since carbide will increase and the etching nature in a mask production process will be checked if there is much C, the upper limit is made into 0.03%. Si forms silicate system inclusion, such as MnO-SiO2 and MnO-FeO-SiO2, and since it checks etching nature as a result, it may be 0.03% or less. Mn may be 0.20 – 0.60% from a viewpoint which prevents the deacidification and hot shortness in steel manufacture. Since steel will harden P and it will spoil rolling nature if the content increases, it makes an upper limit 0.10%. S forms sulfide system inclusion and checks etching nature. Therefore, the lower possible one is desirable and makes the upper limit 0.10%. Although aluminum is added as a deoxidizer at a steel-manufacture process and the inclusion in steel is decreased, if many [too], aluminum2O3 system inclusion will increase in number, and a manufacturing cost will also rise. Therefore, the upper limit is made into 0.10%.
[Function]
the color sorting electrode structure 50-60kg /per grid element assembly of tension of 2 has cost mm — usually — 450-470 degrees C and the conditions for 10 – 20 minutes — melanism — creep arises in a grid element assembly by processing. This creep is the result of compounding of the transition creep which is the plastic deformation by movement of a rearrangement, and the diffusional creep which is the plastic deformation by diffusion of the iron atom itself. Since an iron diffusion coefficient depends on temperature, it is difficult to control diffusional creep at the usual processing temperature. So, in order to make small elongation of the grid element assembly by the creep, it is necessary to make a rearrangement creep as small as possible. In order to control this rearrangement creep, how to form a Cottrell atmosphere with the (i) solute atoms (nitrogen etc.), and fix a rearrangement, the approach of adding an element with a larger atomic radius (for example, Mo) than (ii) iron, and controlling the elongation by the creep, etc. can be considered. According to the approach of (ii), when distortion by the solute atom and distortion of a rearrangement act mutually and a motion of a rearrangement fixes, the depressor effect of a creep is acquired. This invention is based on the approach of (i). general — melanism — in an elevated temperature like processing temperature, solute atoms gather and the so-called Cottrell atmosphere like the clouds of a solute atom is formed in the surroundings of the rearrangement which is exercising since the degree of ****** of solute atoms, such as nitrogen, is quick. For this reason, in order for Bucks Torres who is going to pull back from a **** ambient atmosphere to a motion of a rearrangement to act and to control a motion of a rearrangement, the elongation by the creep becomes comparatively small. in addition, melanism usual in temperature — when processing temperature is exceeded, since the diffusion rate of a solute atom increases, Bucks Torres becomes small, and, for this reason, the depressor effect of a

rearrangement creep becomes small.
therefore, the result by which a creep is controlled by this invention — the melanism of a grid element assembly — the tension distribution after processing — melanism — it becomes close to the condition before processing.
[Example]
One example of the color sorting machine style used for a color cathode-ray tube is shown in Fig. 1 . This color identification scheme (1) has the color sorting electrode structure (5) ****(ed) on the frame (4) of the shape of a frame which consists of the elastic member (3) which maintains at predetermined spacing one pair of supporter material (2) which carries out phase opposite, and these supporter material (2), and the supporter material (2) which counters, and the (so-called aperture grille structure), and is constituted. Many shot element assemblies (6) are formed with a predetermined pitch, and this aperture grille structure (5) changes so that between adjacent grid element assemblies (6) may serve as a slit (7) which an electron beam passes.
In this example, the super-low carbon steel whose nitrogen content is 55 ppm is used. This super-low carbon steel is rolled out in thickness of 0.02-0.30mm, and a steel plate is produced. 70-80kg /of ingredient tensile strength of this steel plate is [mm] 2. Next, it etches into this super-low carbon steel plate, many shot element assemblies (6) are formed, and an aperture grille structure (5) is obtained. Next, on the frame (4) in the condition that pressurization deformation of the supporter material (2) was carried out inside, welding pressure is removed, after carrying out beam welding of this aperture grille structure (5). 50-60kg /of tension per one of the grid element assembly ****(ed) by the frame in this case (4) is [mm] 2.
In addition, the tension of this grid element assembly (6) measures resonance frequency, and asks for it with the following relational expression.
T=4qf2l.2/GT: — the tension per grid element assembly, f:resonance frequency, the mass of q:grid element assembly, G:gravitational acceleration, and the die length of l:grid element assembly a degree — this aperture grille structure (5) — the temperature of 450-470 degrees C — for 10 - 20 minutes — melanism — it processes. in addition, this melanism — in processing, it also has the purpose of distorted picking.
Fig. 2 — melanism — processing before and melanism — the result of having measured the tension of the grid element assembly (6) in the edge (8) and center section (9) of the aperture grille structure (5) after processing is combined with the example of a comparison (a nitrogen content is less than 40 ppm like before), and is shown. this drawing — setting — Curve I — melanism — the tension of the grid element assembly before processing (6), and the melanism of the grid element assembly (6) which Curve II requires for this example — the tension after processing, and the melanism of the grid element assembly which Curve III requires for the example of a comparison — the tension after processing is shown, respectively. the edge (8) of this graph to an aperture grille structure (5) — setting — melanism — the aperture grille structure (5) which requires the rate of a fall of the tension after processing for this example compared with the example of a comparison (curve III), and the (curve II) are smaller, therefore it turns out that generating of a creep is controlled. consequently, the melanism of a shot element assembly — the tension after processing — melanism — it is close to the condition before processing. Since the elongation of the grid element assembly (6) in the edge (8) of an aperture grille structure (5) influences greatly, it is important for especially a color gap of both sides to suppress small the tension fall of the grid element assembly (6) in an edge (8).
next, melanism [in / the tube type of a cathode-ray tube is changed into Table 1, and / aperture grille / of a cathode-ray tube (13 inches, 14 inches, and 18 inches) / an edge and a center section] — the result of having measured the tension of the grid element assembly after processing is shown. The nitrogen content of the example of a comparison is the same as the case of the above-mentioned example of a comparison. Front Naka and effectiveness are the rates to the example of a comparison of an example, ** shows a rise and ** shows descent, respectively. although a rate changes with tube types in an edge from this table by this invention — melanism — it turns out that the effectiveness, i.e., the depressor effect of a creep, of preventing the fall of the tension of the grid element assembly after processing is acquired.

表 1

(単位：kg／㎟)

	13インチ		14インチ		18インチ	
	端部	中央部	端部	中央部	端部	中央部
実施例	26.5	7.7	21.5	4.5	24.0	6.8
比較例	23.0	9.3	19.6	4.8	22.8	6.9
効果 (%)	15↑	17↓	10↑	6↓	5↑	1↓

[Effect of the Invention]
controlling the nitrogen content in the aperture grille structure of a color sorting electrode in the predetermined range according to this invention — melanism — generating of the creep after processing can be controlled, therefore the fall of the tension of a grid element assembly can be suppressed low. It becomes possible to aim at the improvement of a color gap of the screen which the conventional creep became a cause and had been generated by this. Moreover, modification of the design change of a frame like before and the relation facility further accompanying it becomes unnecessary.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
Fig. 1 — the perspective view of a color sorting machine style, and Fig. 2 — melanism — it is the graph which measured the tension of the grid element assembly in the edge and center section of the aperture grille structure before and after processing.
For (1), as for a frame and (5), a color sorting machine style and (4) are [an aperture grille structure and (6)] grid element assemblies.

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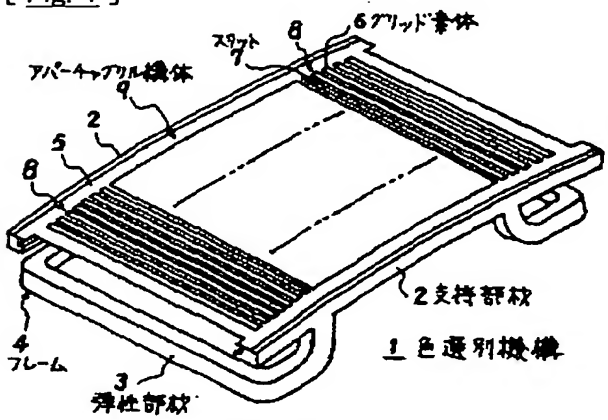
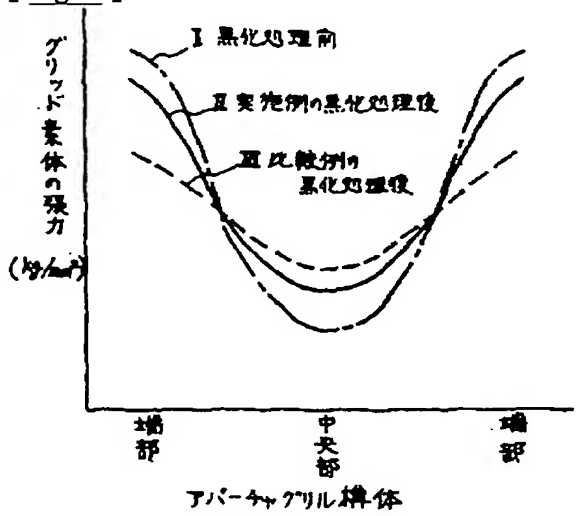
DRAWINGS

[Fig. 1]



色選別機構の斜視図

[Fig. 2]



アパーチャグリル構体

[Translation done.]